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File Systems

Pleiades Home Filesystem

DRAFT

This article is being reviewed for completeness and technical accuracy.

The home file system on Pleiades (/u/username) is an SGI NEXIS 9000 filesystem. It is NFS-mounted on all of the Pleiades front-ends, bridge nodes and compute nodes.

Once a user is granted an account on Pleiades, the home directory is set up automatically during his/her first login.

Quota and Policy

Disk space quota limits are enforced on the home filesystem. By default, the soft limit is 8GB and the hard limit is 10GB. There are no inode limits on the home filesystem.

To check your quota and usage on your home filesystem, do:

```
%quota -v
Disk quotas for user username (uid xxxx):
     Filesystem  blocks   quota   limit   grace   files   quota   limit   grace
saturn-ib1-0:/mnt/home2
                7380152  8000000 40000000          190950       0       0
```

The quota policy for NAS states that if you exceed the soft quota, an email will be sent to inform you of your current usage and how much of your grace period remains. It is expected that a user will occasionally exceed their soft limit as needed, however after 14 days, users who are still over their soft limit will have their batch queue access to Pleiades disabled. If you believe that you have a long-term need for higher quota limits, you should send an email justification to support@nas.nasa.gov. This will be reviewed by the HECC Deputy Project Manager, Bill Thigpen, for approval.

The quota policy for NAS can be found here.

Backup Policy

Files on the home filesystem are backed up daily.

Pleiades Lustre Filesystems

Pleiades has several Lustre filesystems (/nobackupp[10-60]) that provide a total of about 3 PB of storage and serve thousands of cores. These filesystems are managed under Lustre software version 1.8.2.

Lustre filesystem configurations are summarized at the end of this article.

Which /nobackup should I use?

Once you are granted an account on Pleiades, you will be assigned to use one of the Lustre filesystems. You can find out which Lustre filesystem you have been assigned to by doing the following:

```
pfe1% ls -l /nobackup/your_username
lrwxrwxrwx 1 root root 19 Feb 23  2010 /nobackup/username -> /nobackupp30/username
```

In the above example, the user is assigned to /nobackupp30 and a symlink is created to point the user's default /nobackup to /nobackupp30.

TIP: Each Pleiades Lustre filesystem is shared among many users. To get good I/O performance for your applications and avoid impeding I/O operations of other users, read the articles: Lustre Basics and Lustre Best Practices.

Default Quota and Policy on /nobackup

Disk space and inodes quotas are enforced on the /nobackup filesystems. The default soft and hard limits for inodes are 75,000 and 100,000, respectively. Those for the disk space are 200GB and 400GB, respectively. To check your disk space and inodes usage and quota on your /nobackup, use the *lfs* command and type the following:

```
%lfs quota -u username /nobackup/username
Disk quotas for user username (uid xxxx):
   Filesystem  kbytes       quota   limit   grace   files   quota   limit   grace
/nobackup/username 1234  210000000 420000000    -     567   75000  100000       -
```

The NAS quota policy states that if you exceed the soft quota, an email will be sent to inform you of your current usage and how much of your grace period remains. It is expected that users will occasionally exceed their soft limit, as needed; however after 14 days, users who are still over their soft limit will have their batch queue access to Pleiades disabled.

If you anticipate having a long-term need for higher quota limits, please send a justification via email to support@nas.nasa.gov. This will be reviewed by the HECC Deputy Project Manager for approval.

For more information, see also, Quota Policy on Disk Space and Files.

NOTE: If you reach the hard limit while your job is running, the job will die prematurely without providing useful messages in the PBS output/error files. A Lustre error with code -122 in the system log file indicates that you are over your quota.

In addition, when a Lustre filesystem is full, jobs writing to it will hang. A Lustre error with code -28 in the system log file indicates that the filesystem is full. The NAS Control Room staff normally will send out emails to the top users of a filesystem asking them to clean up their files.

Important: Backup Policy

As the names suggest, these filesystems are not backed up, so any files that are removed *cannot* be restored. Essential data should be stored on Lou1-3 or onto other more permanent storage.

Configurations

In the table below, /nobackupp[10-60] have been abbreviated as p[10-60].

Pleiades Lustre Configurations

Filesystem	p10	p20	p30	p40	p50	p60
# of MDSes	1	1	1	1	1	1
# of MDTs	1	1	1	1	1	1
size of MDTs	1.1T	1.0T	1.2T	0.6T	0.6T	0.6T
# of usable inodes on MDTs	~235x10^6	~115x10^6	~110x10^6	~57x10^6	~113x10^6	~123x10^6
# of OSSes	8	8	8	8	8	8
# of OSTs	120	60	120	60	60	60
size/OST	7.2T	7.2T	3.5T	3.5T	7.2T	7.2T
Total Space	862T	431T	422T	213T	431T	431T
Default Stripe Size	4M	4M	4M	4M	4M	4M
Default Stripe Count	1	1	1	1	1	1

NOTE: The default stripe count and stripe size were changed on January 13, 2011. For directories created prior to this change, if you did not explictly set the stripe count and/or stripe size, the default values (stripe count 4 and stripe size 1MB) were used. This means that files created prior to January 13, 2011 had those old default values. After this date, directories without an explicit setting of stripe count and/or stripe size adopted the new stripe count of 1 and stripe size of 4MB. However, the old files in that directory will retain their old default values. New files that you create in these directories will adopt the new

default values.

Columbia Home Filesystems

DRAFT

This article is being reviewed for completeness and technical accuracy.

Columbia's home fileystem (/u/username) is NFS-mounted on the Columbia front-end (cfe2) and compute nodes (Columbia21-24).

Once a user is granted an account on Columbia, the home directory is set up automatically during his/her first login.

Quota and Policy

Disk space quota limits are enforced on the home filesystem. By default, the soft limit is 4GB and the hard limit is 5GB. There are no inode limits on the home filesystem.

To check your quota and usage on your home filesystem, do:

```
%quota -v
Disk quotas for user username (uid xxxx):
     Filesystem  blocks   quota   limit   grace   files   quota   limit   grace
  ch-rg1:/home6    4888  4000000 5000000            294       0       0
```

The quota policy for NAS states that if you exceed the soft quota, an email will be sent to inform you of your current usage and how much of your grace period remains. It is expected that a user will occasionally exceed their soft limit as needed; however after 14 days, users who are still over their soft limit will have their batch queue access to Pleiades disabled. If you believe that you have a long-term need for higher quota limits, you should send an email justification to support@nas.nasa.gov. This will be reviewed by the HECC Deputy Project Manager, Bill Thigpen, for approval.

The quota policy for NAS can be found here.

Backup Policy

Files on the home filesystem are backed up daily.

Columbia CXFS Filesystems

Columbia CXFS filesystems (/nobackup[1-2][a-i]) are shared and accessible from cfe2 and Columbia21-24. This allows user jobs to be load-balanced across Columbia's systems without forcing users to move their data to a particular Columbia system.

Users will have a nobackup directory on one of these shared file systems. To find out where your nobackup directory is, log in to the front-end node and type the following shell command:

```
cfe2% ls -d /nobackup[1-2][a-i]/$USER
/nobackup1f/username/
```

In this example, the user is assigned to /nobackup1f.

Default Quota and Policy on /nobackup

Disk space and inodes quotas are enforced on the CXFS /nobackup[1-2][a-i] filesystems. The default soft and hard limits for inodes are 25,000 and 50,000, respectively. Those for disk space are 200GB and 400GB, respectively. To check your disk space and inodes usage and quotas on your CXFS filesystem, do the following:

```
cfe2% quota -v
Disk quotas for user username (uid xxxx):
     Filesystem  blocks   quota   limit   grace   files   quota   limit   grace
/dev/cxvm/nobackup1f
                1673856  210000000 420000000             10973   25000   50000
```

The NAS quota policy states that if you exceed the soft quota, an email will be sent to inform you of your current usage and how much of your grace period remains. It is expected that users will occasionally exceed their soft limit, as needed; however after 14 days, users who are still over their soft limit will have their batch queue access to Columbia disabled.

If you anticipate having a long-term need for higher quota limits, please send a justification via email to support@nas.nasa.gov. This will be reviewed by the HECC Deputy Project Manager for approval.

For more information, see also, Quota Policy on Disk Space and Files.

Important: Backup Policy

As the names suggest, these filesystems are not backed up, so any files that are removed *cannot* be restored. Essential data should be stored on Lou1-3 or onto other more permanent storage.

Accessing CXFS from Lou

The Columbia CXFS filesystems are also mounted on Lou1-3. This allows you to copy files between the CXFS filesystems and your Lou home filesystem, using the *cp* or *cxfscp* commands on Lou.